S.Y.B.Tech. in Electrical Engineering

Course Credit System

REGULATION 2022

NOTES:

(1) Refer (i) Academic rules and regulations and (ii) Examination rules and regulations for further details.

(2) Laboratory course is considered as a separate head of passing.

(3) Assessment criteria for laboratory/Tutorial work. i.e. weightage for assessment shall be as follows: i) Attendance in Laboratory/Tutorial = 20%, (ii) Journal= 40%, (iii) Practical Examination (and/or) Mini project (and/or) Quiz (and/or) Seminar (and/or) Oral (and/or) Industry visit report= 40%.

(4) Internal Evaluation will be carried out by the course instructor for 10 points. It is the continuous evaluation throughout the semester. The evaluation will be based on minimum three of the following activities decided by course instructor. The maximum points that can be assigned to one activity will be 04. The course instructor needs to inform the students and head of the department about the activities those will be considered for IE and the points assigned to them in first week of semester. The course instructor will submit the internal evaluation points (out of 10 with activity wise break up) to examination section before the beginning of End Semester examination. List of Activities: 1. Class Involvement 2. Assignments 3. Problem Solving 4. Mini project 5. Quizzes 6. Presentation 7. Oral

(5) Student can opt for an online course available on https://swayam.gov.in/ or https://onlinecourses.nptel.ac.in/ subject to approval from the department. After successful completion of the course, the course title can appear on the grade card of a student.

(6) The Mandatory courses are with Pass (P) and No Pass (NP) grades.

(7) Department will offer Value Added courses in a semester, subject to availability of resources and enrolment of minimum 20 students opting for the course. Upon completion of the Value Added course, the course title shall appear in the grade card of the student.

(8) Students can optionally opt for Non-Technical Value Added courses offered by Center for Continuing Education (CCE-SPCE). Upon successful completion of the course, the course title shall appear on the grade card of the student.

(9) The contents of core courses are aligned with the latest GATE syllabus. The mapping between GATE syllabus topics and core courses is given in Table GATE-MAP.

Courses Offered for Second Year B.Tech. in Electrical Engineering (Semester III) Applicable for the students entering in First Year in Academic Year 2022-23 (Applicable from 2023-24)														
Sr. No.	**Course Name**	**Code**	**Course Plan per Week (Hrs)**			**Credits**	**In semester Evaluation (Points)**			**End Semester Evaluation (Points)**		**End semester weightage (%)**	**Term work /Practical**	**Total Points**
			L	**P**	**T**		**T-I**	**T-II**	**IE**	**Points**	**Time (Hrs)**			
Core Courses														
1	Laplace Transform, Vector calculus & Linear Algebra	BS-BTE301	3	0	1	4	15	15	10	100	3	60%	25	125
2	Electronic circuits	PC-BTE301	3	0	0	3	15	15	10	100	3	60%	0	100
3	Electrical Networks	PC-BTE302	3	0	0	3	15	15	10	100	3	60%	0	100
4	Digital Electronics	PC-BTE303	3	0	0	3	15	15	10	100	3	60%	0	100
5	Electromagnetic Fields and Waves	PC-BTE304	3	0	0	3	15	15	10	100	3	60%	0	100
6	Organizational Communication and interpersonal skills	HS-BTE301	2	0	1	3	15	15	10	100	3	60%	25	125
Laboratory Courses														
7	Electronic Circuits Laboratory	PC-BTE351	0	2	0	1	0	0	0	0	0	0%	50	50
8	Electrical Networks Laboratory	PC-BTE352	0	2	0	1	0	0	0	0	0	0%	50	50
9	Digital Electronics Laboratory	PC-BTE353	0	2	0	1	0	0	0	0	0	0%	50	50
10	Electromagnetic Fields and Waves Laboratory	PC-BTE354	0	2	0	1	0	0	0	0	0	0%	50	50
Value Added Courses														
11	#Value Added Tech./Non-Tech.	VA-BTExxx, VA-BTExxx, VN-BTxxx	Courses offered by Department / CCE											

	TOTAL		**23**	

IE: Internal Evaluation

List of courses will be announced at the beginning of the academic year.

Courses Offered for Second Year B.Tech. in Electrical Engineering (Semester IV)
Applicable for the students entering in First Year in Academic Year 2022-23 (Applicable from 2023-24)

Sr. No.	Course Name	Code	Course Plan per Week (Hrs)			Credits	In semester Evaluation (Points)			End Semester Evaluation (Points)		End semester weightage (%)	Term work/Practical	Total Points
			L	P	T		T-I	T-II	IE	Points	Time (Hrs)		(Note 2)	
Core Courses														
1	Transforms, Statistics and Probability	BS-BTE401	3	0	1	4	15	15	10	100	3	60%	25	125
2	Power Generation, Transmission and Distribution	PC-BTE401	3	0	1	4	15	15	10	100	3	60%	25	125
3	Power Electronics	PC-BTE402	3	0	0	3	15	15	10	100	3	60%	0	100
4	Electrical Machines-I	PC-BTE403	3	0	0	3	15	15	10	100	3	60%	0	100
5	Microprocessor and Micro-controller	PC-BTE404	3	0	0	3	15	15	10	100	3	60%	0	100
6	Signals and Systems	PC-BTE405	3	0	0	3	15	15	10	100	3	60%	0	100
Laboratory Courses														
7	Power Electronics Laboratory	PC-BTE452	0	2	0	1	0	0	0	0	0	0	50	50
8	Electrical Machine-I Laboratory	PC-BTE453	0	2	0	1	0	0	0	0	0	0	50	50
9	Microprocessor and Micro-Controller	PC-BTE454	0	2	0	1	0	0	0	0	0	0	50	50
10	Signals and systems Laboratory	PC-BTE455	0	2	0	1	0	0	0	0	0	0	50	50
Mandatory Courses														
11	#Mandatory Courses	MC-BTExxx	2	0	0	0	15	15	10	100	2	60%	0	100

Online Courses				
12	#Online course	OL-BTExxx		
Value Added Courses				
13	#Value Added Tech./Non-Tech.	VA-BTExxx, VA-BTExxx, VN-BTxxx	Courses offered by Department / CCE	
	TOTAL		**24**	

IE: Internal Evaluation

List of courses will be announced at the beginning of the academic year.

List of Value added courses

Sr No.	Name of the course	Course code
1	Soft-computing	VA-BTE001
2	Semiconductor Devices and PCB design	VA-BTE002
3	Open source operating systems and Software (Linux, python/ SciLab/octave/ R)	VA-BTE003
4	Electrical and Electronics Simulation Lab	VA-BTE004

T.Y.B.Tech. in Electrical Engineering
Course Credit System
REGULATION 2022

NOTES:

1. Refer (i) Academic rules and regulations and (ii) Examination rules and regulations for further details
2. Laboratory course is considered as a separate head of passing.
3. Assessment criteria for laboratory/Tutorial work. i.e., weightage for assessment shall be as follows: i) Attendance in Laboratory/Tutorial = 20%, (ii) Journal= 40%, (iii) Practical Examination (and/or) Mini project (and/or) Quiz (and/or) Seminar (and/or) Oral (and/or) Industry visit report= 40%.
4. Internal Evaluation will be carried out by the course instructor for 10 points. It is the continuous evaluation throughout the semester. The evaluation will be based on minimum three of the following activities decided by course instructor. The maximum points that can be assigned to one activity will be 04. The course instructor needs to inform the students and head of the department about the activities those will be considered for IE and the points assigned to them in first week of semester. The course instructor will submit the internal evaluation points (out of 10 with activity wise break up) to examination section before the beginning of End Semester examination. List of Activities: 1. Class Involvement 2. Assignments 3. Problem Solving 4. Mini project 5. Quizzes 6. Presentation 7. Oral
5. Student can opt for an online course available on https://swayam.gov.in/ or https://onlinecourses.nptel.ac.in/ subject to approval from the department. After successful completion of the course, the course title can appear on the grade card of student.
6. The Mandatory courses are with Pass (P) and No Pass (NP) grades.
7. Department will offer Value Added courses in a semester, subject to availability of resources and enrolment of minimum 20 students opting for the course. Upon completion of the Value Added course, the course title shall appear in the grade card of the student.
8. Students can optionally opt for Non-Technical Value Added courses offered by Center for Continuing Education (CCE-SPCE). Upon successful completion of the course, the course title shall appear on the grade card of the student.
9. The contents of core courses are aligned with the latest GATE syllabus. The mapping between GATE syllabus topics and core courses is given in Table GATE-MAP.
10. For Open Elective courses, students with C.P.I. higher than 8.5, can opt for an online course (approved by the department) offered through SWAYAM or NPTEL portal instead of elective courses offered by department/institute. Upon successful completion of the course, the score given on certificate issued by SWAYAM/NPTEL will be converted to letter grade as per applicable examination regulation.
11. For Project Course: Contact hours =2 and self-learning hours will be as per student's choice; It will have in-semester evaluation which shall include one or more in-semester presentations. 10 points for report and 10 points for presentation and viva voce examined by supervisor and one internal examiner.

Courses Offered for Third Year B.Tech. in Electrical Engineering (Semester V) Applicable for the students entering in First Year in Academic Year 2022-23 (Applicable from 2024-25)														
Sr. No.	Course Name	Code	Course Plan per Week (Hrs)			Credits	In semester Evaluation (Points)			End Semester Evaluation (Points)		End semester weightage (%)	Term work/Practical	Total Points
			L	P	T		T-I	T-II	IE	Points	Time (Hrs)		(Note 2)	
Core Courses														
1	Measurements & Instrumentation	PC-BTE501	3	0	0	3	15	15	10	100	3	60%	0	100
2	Control System	PC-BTE502	3	0	0	3	15	15	10	100	3	60%	0	100
3	Electrical Machine-II	PC-BTE503	3	0	0	3	15	15	10	100	3	60%	0	100
4	Power System Analysis	PC-BTE504	3	0	0	3	15	15	10	100	3	60%	0	100
5	Communication Engineering	PC-BTE505	3	0	0	3	15	15	10	100	3	60%	0	100
Laboratory Courses														
6	Measurements & Instrumentation Laboratory	PC-BTE551	0	2	0	1	0	0	0	0	0	0	50	50
7	Control System Laboratory	PC-BTE552	0	2	0	1	0	0	0	0	0	0	50	50
8	Elect. Mach. II Laboratory	PC-BTE553	0	2	0	1	0	0	0	0	0	0	50	50
9	Power System Analysis	PC-BTE554	0	2	0	1	0	0	0	0	0	0	50	50
Professional Elective Course														
10	#Professional Elective Course - I	PE-BTE5xx	3	0	1	4	15	15	10	100	3	60%	25	125
Mandatory Courses														
11	#Mandatory Courses	MC-BTExxx	2	0	0	0	15	15	10	100	3	60%		100
Mandatory Skill Based Courses														
	#Skill Based Course	SK-BTExxx	0	2	0	0	0	0	0	0	0	0	50	50
Online Courses														
12	#Online Course	OL-BTExxx												

Value Added Courses				
13	#Value Added Tech./Non-Tech.	VA-BTExxx, VA-BTxxx VN-BTxxx	Courses offered by Department / CCE	
	TOTAL		**23**	

IE: Internal Evaluation

List of courses will be announced at the beginning of the academic year.

List of Professional Elective PE-I

1) PE-BTE501 Design of Power Electronics converters
2) PE-BTE502 Sensors and Actuators
3) PE-BTE503 Digital Signal Processing

List of Skill based courses

Sr No.	Name of the course	Course code
1	Electrical Simulation Lab	SK-BTE001
2	Electronics Design Laboratory	SK-BTE002
3	DSP Processor and applications to electrical engineering	SK-BTE003
4	Programmable Logic Controllers	SK-BTE004

Courses Offered for Third Year B.Tech. in Electrical Engineering (Semester VI) Applicable for the students entering in First Year in Academic Year 2022-23 (Applicable from 2024-25)														
Sr. No.	**Course Name**	**Code**	**Course Plan per Week (Hrs)**			**Credits**	**In semester Evaluation (Points)**			**End Semester Evaluation (Points)**		**End semester weightage (%)**	**Term work/Practical**	**Total Points**
			L	**P**	**T**		**T-I**	**T-II**	**IE**	**Points**	**Time (Hrs)**		**(Note 2)**	
Core Courses														
1	Power system Operation and Control	PC-BTE601	3	0	0	3	15	15	10	100	3	60%	0	100
2	Electrical Drives	PC-BTE602	3	0	0	3	15	15	10	100	3	60%	0	100
3	Switchgear and Protection	PC-BTE603	3	0	0	3	15	15	10	100	3	60%	0	100
Laboratory Courses														
4	Power system Operation and Control Laboratory	PC-BTE651	0	2	0	1	0	0	0	0	0	0	50	50
5	Electrical Drives Laboratory	PC-BTE652	0	2	0	1	0	0	0	0	0	0	50	50
6	Switchgear and Protection Laboratory	PC-BTE653	0	2	0	1	0	0	0	0	0	0	50	50
Professional Elective Course														
7	#Professional Elective Course - II	PE-BTE6xx	3	0	1	4	15	15	10	100	3	60%	25	125
8	#Professional Elective Course - III	PE-BTE6xx	3	0	1	4	15	15	10	100	3	60%	25	125
Open Elective Course														
9	#Open Elective -I	OE-BTx6xx	3	0	0	3	15	15	10	100	3	60%		100
Project Course														
10	Project Stage I	PR-BTE601	2			1	Two or more In-semester presentations						50	50
Online Courses														
12	#Online Course	OL-BTExxx												
Value Added Courses														
13	#Value Added Tech./Non-Tech.	VA-BTExxx, VA-BTxxx VN-BTxxx	Courses offered by CCE											
	TOTAL					**24**								

IE: Internal Evaluation

#List of course will be announced at the start of academic year.

List of Professional Elective PE-II

1) PE-BTE601 Renewable Energy Sources
2) PE-BTE602 Design and Management of Electrical Systems
3) PE-BTE603 Electrical Machine Design
4) PE-BTE604 Control System Design

List of Professional Elective PE-III

1) PE-BTE611 Basics of Automotive Systems
2) PE-BTE612 Micro-grid and Distributed generation
3) PE-BTE613 Digital Control Design

List of Open Elective OE-I

1) OE-BTE601 Power Plant Engineering
2) OE-BTE602 VLSI Circuits
3) OE-BTE603 Linear Algebra and Matrix Computation
4) OE-BTE604 Computer Architecture
5) OE-BTE605 Project Management

Additional Open Elective Courses available: Refer open elective courses offered by the Civil and Mechanical Engineering Department of SPCE

List of Value added courses

Sr No.	Name of the course	Course code
1	Soft Computing	VA-BTE001
2	Open source operating systems and Software (Linux, python/ SciLab/octave/ R)	VA-BTE003
3	Finite Element Methods for Electrical Engineering	VA-BTE005
4	Numerical Methods for Engineers	VA-BTE006
5	Sensors and smart meters	VA-BTE007
6	Cables and Cable Management Systems	VA-BTE008
7	ETAP and WAMS	VA-BTE009
8	Solar PV Installation	VA-BTE010
9	Motor starters and drives operation and maintenance	VA-BTE011

Final Year B.Tech. in Electrical Engineering
Course Credit System
REGULATION 2022

NOTES:

1. Refer (i) Academic rules and regulations and (ii) Examination rules and regulations for further details.
2. Laboratory course is considered as a separate head of passing.
3. Assessment criteria for laboratory/Tutorial work. i.e. weightage for assessment shall be as follows: i) Attendance in Laboratory/Tutorial = 20%, (ii) Journal= 40%, (iii) Practical Examination (and/or) Mini project (and/or) Quiz (and/or) Seminar (and/or) Oral (and/or) Industry visit report= 40%.
4. Internal Evaluation will be carried out by the course instructor for 10 points. It is the continuous evaluation throughout the semester. The evaluation will be based on minimum three of the following activities decided by course instructor. The maximum points that can be assigned to one activity will be 04. The course instructor needs to inform the students and head of the department about the activities those will be considered for IE and the points assigned to them in first week of semester. The course instructor will submit the internal evaluation points (out of 10 with activity wise break up) to examination section before the beginning of End Semester examination. List of Activities: 1. Class Involvement 2. Assignments 3. Problem Solving 4. Mini project 5. Quizzes 6. Presentation 7. Oral
5. Student can opt for an online course available on https://swayam.gov.in/ or https://onlinecourses.nptel.ac.in/ subject to approval from the department. After successful completion of the course, the course title can appear on the grade card of student.
6. Department will offer the Value Added courses in a semester subject to availability of resources and enrolment of minimum 20 students opting for the course. Upon completion of the Value Added course, the course title shall appear in the grade card of the student.
7. Students can optionally opt for Non-Technical Value Added courses offered by Center for Continuing Education (CCE-SPCE). Upon successful completion of the course, the course title shall appear on student's grade card.
8. The contents of core courses are aligned with the latest GATE syllabus. The mapping between GATE syllabus topics and core courses is given in Table GATE-MAP.
9. For Open Elective courses, students with C.P.I. higher than 8.5, can opt for an online course (approved by the department) offered through SWAYAM or NPTEL portal instead of elective courses offered by department/institute. Upon successful completion of the course, the score given on certificate issued by SWAYAM/NPTEL will be converted to letter grade as per applicable examination regulation.
10. For Project Course: Contact hours = 2 and self-learning hours ($) = 6; It will have in-semester evaluation which shall include one or more in-semester presentations.
11. For Internship: Refer Academic book for details.

Courses Offered for Final Year B.Tech. in Electrical Engineering (Semester VII) Applicable for the students entering in First Year in Academic Year 2022-23 (Applicable from 2025-26)															
Sr. No.	**Course Name**	**Code**	**Course Plan per Week (Hrs)**			**Credits**	**In semester Evaluation (Points)**			**End Semester Evaluation (Points)**		**End semester weightage (%)**	**Term work/Practical**	**Total Points**
			L	**P**	**T**		**T-I**	**T-II**	**IE**	**Points**	**Time (Hrs)**			
Professional Elective Course														
3	#Professional Elective - IV	PE-BTE7xx	3	0	1	4	15	15	10	100	3	60%	25	125
	#Professional Elective - V	PE-BTE7xx	3	0	1	4	15	15	10	100	3	60%	25	125
4	#Professional Elective - VI	PE-BTE7xx	3	0	1	4	15	15	10	100	3	60%	25	125
Open Elective Course														
5	#Open Elective - II	OE-BTx7xx	3	0	0	3	15	15	10	100	3	60%		100
Project Course														
6	Project Stage II	PR-BTE701	2 + 6$			4	Two or more In-semester presentations						100	100
Online Courses														
7	#Online Course	OL-BTExxx												
Value Added Courses														
8	#Value Added Tech./Non-Tech.	VA-BTExxx, VA-BTxxx VN-BTxxx	Courses offered by Department / CCE											
	TOTAL					**19**								

IE: Internal Evaluation

#List of courses will be announced at the beginning of the academic year.

List of Professional Elective PE-IV

1) PE-BTE701 Advanced Electric Drives
2) PE-BTE702 Computer Aided Power System Analysis
3) PE-BTE703 Smart Grid
4) PE-BTE704 Industrial Automation

List of Professional Elective PE-V

1) PE-BTE711 Vehicular systems and control of EV drives
2) PE-BTE712 Restructuring and Deregulation of Power System
3) PE-BTE713 Power Quality and FACTS
4) PE-BTE714 Advanced Techniques in Power System Protection
5) PE-BTE715 Non-linear control system

List of Professional Elective PE-VI

1) PE-BTE721 Energy storage and Vehicle Management System
2) PE-BTE722 Modelling and Analysis of Electrical Machine
3) PE-BTE723 High Voltage Engineering
4) PE-BTE724 Modern Power System : Challenges and mitigation
5) PE-BTE725 Embedded System

List of Open Elective OE-II

1) OE-BTE701 Electrical Installation Practices
2) OE-BTE702 Image Processing
3) OE-BTE703 Artificial Intelligence
4) OE-BTE704 Medical Electronics
5) OE-BTE705 Engineering Economics

Additional Open Elective Courses available: Refer open elective courses offered by the Civil and Mechanical Engineering Department of SPCE

List of Value added courses

Sr No.	Name of the course	Course code
1	Finite Element Methods for Electrical Engineering	VA-BTE005
2	Numerical Methods for Engineers	VA-BTE006
3	Sensors and smart meters	VA-BTE007
4	Cables and Cable Management Systems	VA-BTE008
5	ETAP and WAMS	VA-BTE009
6	Solar PV Installation	VA-BTE010
7	Motor starters and drives operation and maintenance	VA-BTE011

Courses Offered for Final Year B.Tech. in Electrical Engineering (Semester VIII) Applicable for the students entering in First Year in Academic Year 2022-23 (Applicable from 2025-26)													
Sr. No.	**Course Name**	**Code**	**Course Plan per Week (Hrs)**			**Credits**	**In semester Evaluation (Points)**		**End Semester Evaluation (Points)**		**End semester weightage (%)**	**Term work/Practical**	**Total Points**
			L	**P**	**T**		**T-I**	**T-II**	**Points**	**Time (Hrs)**			
Open Elective Course													
1	Open Elective -III	OE-BTE8xx	**SWAYAM / NPTL** Course of 12 weeks			3			-	-	-	100	100
Internship													
2	External / Internal Internship	PR-BTE899				9	Refer institute academic book for details					200	200
	TOTAL					**12**							

List of Open Elective OE-III

1) OE-BTE801 Energy Audit and Management
2) OE-BTE802 Industry 4.0
3) OE-BTE803 Internet of Things
4) OE-BTE804 Computer Network
5) OE-BTE805 Robotics

Additional Open Elective Courses available: Refer open elective courses offered by the Civil and Mechanical Engineering Department of SPCE

List of Professional Electives Tracks

Professional Elective-I	Professional Elective-II	Professional Elective-III	Professional Elective-IV	Professional Elective-V	Professional Elective-VI
Sem V	**Sem VI**	**Sem VI**	**Sem VII**	**Sem VII**	**Sem VII**
ELECTRIC VEHICLES & POWER ELECTRONICS TRACK					
Design of Power Electronics converters PE-BTE501	Renewable Energy Sources PE-BTE601	Basics of Automotive Systems PE-BTE611	Advanced Electric Drives PE-BTE701	Vehicular systems and control of EV drives PE-BTE711	Energy storage and Vehicle Management System PE-BTE721
POWER SYSTEM & POWER ELECTRONICS TRACK					
Sensors and Actuators PE-BTE502	Design and Management of Electrical Systems PE-BTE602	Micro-grid and Distributed generation BTE612	Computer Aided Power System Analysis PE-BTE702	Restructuring and Deregulation of Power System PE-BTE712	Modelling and Analysis of Electrical Machine PE-BTE722
			Smart Grid PE-BTE703	Power Quality and FACTS PE-BTE713	High Voltage Engineering PE-BTE723
	Electrical Machine Design PE-BTE603			Advanced Techniques in Power System Protection PE-BTE714	Modern Power System : Challenges and mitigation PE-BTE724
CONTROL SYSTEM TRACK					
Digital Signal Processing PE-BTE503	Control System Design PE-BTE604	Digital Control Design BTE613	Industrial Automation PE-BTE704	Non-linear control system PE-BTE715	Embedded System PE-BTE725

Table GATE-MAP: Alignment of Course Content with GATE Syllabus

B.Tech. in Electrical Engineering

Sr. No.	Topics from GATE Syllabus	Related Core Courses in Electrical Engineering. Semester
1	Section 1 Engineering Mathematics	Differential Calculus & Complex Numbers, Integral Calculus & Differential Equations Laplace Transform, Vector calculus & Linear Algebra Transforms, Statistics and Probability
2	Section 2 Electric Circuits	Electrical Networks
3	Section 3 Electromagnetic Fields	Electromagnetic Fields and Waves
4	Section 4 Signals and Systems	Signals and Systems
5	Section 5 Electrical Machines	Electrical Machines I and II
6	Section 6 Power Systems	Power Generation, Transmission and Distribution Power System Analysis Power System Operation and Control
7	Section 7 Control Systems	Control System
8	Section 8 Electrical and Electronic Measurements	Measurements & Instrumentation
9	Section 9 Analog and Digital Electronics	Electronic Circuits, Digital Electronics, Communication Engineering
10	Section 10 Power Electronics	Power Electronics